

**Outsourcing the Light Infantry Division's
Information System**

**A Monograph
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ABSTRACT

OUTSOURCING THE LIGHT INFANTRY DIVISION'S INFORMATION SYSTEM.

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Leveraging technology for a competitive advantage is a crucial element of the US Army's future. New US Army doctrinal concepts utilize technology to gain information superiority in unprecedented fashion. Information superiority becomes a decisive point for attaining mission accomplishment. The information system employed by future US Army organizations is the means of achieving information superiority.

Outsourcing provides a means of leveraging technology for an advantage. Outsourcing is so successful that it has created its own industry in the 1990s. The Department of Defense capitalizes on the advantages of outsourcing to gain significant benefits.

The question that this monograph answers is whether a Light Infantry Division should outsource all, or a part of, its information system. The monograph examines extending the outsourcing trend to a Light Infantry Division to see if there is a limit in replacing signal soldiers and military equipment with contractors. The monograph answers this question by using an analytical model that is recommended by information management professionals in the private sector.

Examination begins by identifying the relevance of outsourcing to the US military. Next, the monograph introduces a core identification model used by information system professionals to analyze outsourcing decisions. The monograph identifies the components of the Light Infantry Division's information system and then analyzes the components within the context of the identification model.

The monograph concludes that outsourcing will gain an ever increasing role in the Light Infantry Division. Outsourcing will leverage near-term advantages for the division during crisis response scenarios. Outsourcing will also assist in obtaining information superiority for the future experimental Light Infantry Division design.

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Chapter One

Introduction

Leveraging technology for a competitive advantage is a crucial element of the Army's future. New US Army doctrinal concepts utilize technology to gain information superiority in unprecedented fashion. Information superiority becomes a decisive point for attaining mission accomplishment. The information system employed by these future organizations is the means of achieving information superiority.

Innovation to leverage the advantages of an information system has occurred in the United States Army since the birth of the Signal Corps.¹ In 1864, General Ulysses S. Grant coordinated the operations of the Union Army by means of the telegraph.² Grant's daily use of this emerging technology provided the means for successful operational level command and control.³

The definition of outsourcing is contracting another party to provide a supplemental "function or service".⁴ It is an innovative method of solving problems. A contractor built a portion of General Grant's information system. The distances between Grant's field headquarters and the nearest telegraph office exceeded the ability of the Signal Corps to construct telegraph lines. The Signal Corps turned to a contractor for providing rapid installation. A Signal Corps soldier simply operated the telegraph. A vendor provided most of the system.

Outsourcing provides several advantages for the US Army.⁵ Information system ownership costs are passed from the Army to the outsourcing contractor. The contractor assumes the costs of training and paying a steady force of skilled communication experts. The outsourcing contractor also assumes the cost of keeping the newest technologies available in inventory.

The US Army changes its organization and enhances its information system through outsourcing. Civilian outsourcing contractors provide supplemental services for a fee. The US Army's information system is thus transformed into two distinct parts: a civilian outsourcing component and a traditional military component.

Operation Desert Storm provides an example of outsourcing information system requirements in the US Army. The backbone of the Desert Storm information system was the

Mobile Subscriber Equipment (MSE) network.⁶ MSE is maintained in part by outsourcing civilian acumen.⁷ Civilian MSE technicians are contractors residing within a military unit. They are not Department of Defense civilians. They are not subject to military law or Code of Conduct. Profit and contract obligations govern their performance.

The question that this monograph answers is whether a Light Infantry Division should outsource all, or a part of, its information system. The monograph answers this question by using an analytical model recommended by information management professionals in the private sector.

The monograph examines extending the outsourcing trend to a Light Infantry Division to see if there is a limit in replacing Signal soldiers and military equipment with contractors. Examination begins by identifying the relevance of outsourcing to the US military. Next, the monograph introduces a core identification model used to analyze outsourcing decisions. The fourth chapter will identify the components of the Light Infantry Division's information system. The monograph then analyzes the Division's information system components within the context of the identification model.

The results of the analysis are provided in the monograph's final chapter. Conclusions and recommendations provide a clear understanding of both the benefits and limits in extending the outsourcing trend to a Light Infantry Division's information system. Analysis identifies a set of problems that outsourcing can and cannot resolve for the Division.

Chapter Two

The Relevance of Outsourcing

The Department of Defense is outsourcing many functions. The US Army and its sister services are realizing many advantages. The Light Infantry Division may realize similar advantages by outsourcing its information system.

The purpose of this chapter is to provide a comprehensive foundation for understanding the relevance of outsourcing in the US military. The facts supporting the merit of outsourcing will identify a potential for extending the outsourcing trend to the Light Infantry Division. The chapter provides data from throughout the Department of Defense.

The Department of Defense

The Defense Science Board estimates that the Department of Defense can save between seven to ten billion dollars annually by outsourcing.⁸ This conservative estimate is based on two notions. First, private sector experience in the defense industry is successful. Companies such as Boeing and General Dynamics cut costs anywhere from ten to 30 percent by outsourcing non-core functions. Secondly, these organizations realize a 20 percent saving by outsourcing other support services.

There appears to be a potential for the Department of Defense to continue seeking outsourcing strategies into the future. The Defense Science Board calculates that in 1996 there were 850,000 full-time federal employees involved in commercial activities.⁹ Only 210,000 were private-sector vendors outsourcing a service. The remaining three-quarters, 640,000 full-time federal employees, were additional candidates for outsourcing.

The US Army

"The US Army is emphasizing elimination of its non-core missions."¹⁰ Aberdeen Proving Ground provides an example in the US Army.¹¹ In early 1995, the Aberdeen Area of Aberdeen Proving Ground began outsourcing its natural gas system. The contract provides a new seven-mile main

gas line, gas service to sixteen additional heating plants, and meters on all new connections.

Outsourcing was beneficial at Aberdeen. Aberdeen no longer needed to train and certify a work force to maintain and repair gas lines. The base realized benefits in bringing down the cost of inspecting fuel oil tanks and repairing or replacing them if necessary. Aberdeen eliminated the need to maintain a thirty-day oil reserve at post heating plants and provided better management due to the installation of metering devices.

The 1996 saving was over \$800,000. Aberdeen Proving Ground is now looking at outsourcing its water and wastewater system, electrical distribution system, and the remainder of the post gas system.

The US Navy

The US Navy spends over ten billion dollars annually doing shore activities relating to infrastructure, base support, and real property maintenance.¹² In 2001, the US Navy will attempt to reduce this cost by \$2.5 billion. Outsourcing is the strategy of choice.

In January 1997, the US Navy began to implement their savings plan by outsourcing over 10,000 positions at 146 naval activities. In January 1998, another 7,400 positions were provided through outsourcing. In two years, the US Navy saved thirty-seven percent and are on pace to realize their five year savings strategy.

The US Air Force

The US Air Force expects to save twenty-five percent every time they use outsourcing.¹³ The US Air Force is outsourcing utilities such as electrical distribution systems and heat generation for post housing. Their biggest use of outsourcing is to upgrade the sixty-one thousand base housing units. FY99 Defense Planning Guidance provides a twenty-six year plan to revitalize these units. The US Air Force expects to use outsourcing to upgrade deteriorating housing now and complete the project by 2010.

Summary

Outsourcing is a relevant strategy in the Department of Defense. The service branches gain many benefits, such as cost savings, by outsourcing some functions. Furthermore, the Department of Defense will likely continue outsourcing into the future to realize more advantages.

If the US Army continues to use outsourcing in the future, then advantages and benefits may be realized by

extending the outsourcing trend to a Light Infantry Division. Civilian vendors may provide some functions or services better than a soldier can.

In order to understand why outsourcing provides benefits, the term "outsourcing" requires definition and examination. The monograph's next chapter uses an academic approach to comprehend how outsourcing works and why it might provide an advantage to the Light Infantry Division.

Chapter Three

Outsourcing

Outsourcing provides a competitive advantage for an organization. It is an innovation that is so successful that it created its own industry in the 1990s. Outsourcing is a significant trend in the business community. The Department of Defense is realizing outsourcing benefits. The Light Infantry Division may realize similar success when outsourcing its information system.

This chapter defines the terms outsourcing and information system from an academic perspective.¹⁴ This chapter also specifies outsourcing tenets, advantages and disadvantages in order to comprehend how outsourcing works. The tenets, advantages and disadvantages provide the framework for the monograph's core competency identification model.

Definition of Outsourcing

"Outsourcing is the act of contracting a service or function to an external third party."¹⁵ The key terms in this definition are contracting and third party. Outsourcing is the Light Infantry Division purchasing a service from a vendor through a contractual agreement. Outsourcing is "the practice of turning all or part of an organization's information system functions to one or more external service providers."¹⁶ The key terms in this definition are turning and information system. Outsourcing entails transference of some responsibility of the information system from the Light Infantry Division to a civilian contractor.

The academic definition of an information system is the people, technology, and organization that process raw data into useful information for decision-makers.¹⁷ In a Light Infantry Division, the information system is the soldiers, computer-based data processing systems, and the unit organization and procedures that provide useful information to the commander and staff.

Core Competency

The crux of outsourcing is to never outsource a core competency. Core is the "essence, the most important part."¹⁸ Outsourcing can only provide supplemental service

or function to an organization. Outsourcing cannot replace the fundamental functions of an organization.

In the business community, outsourcing a core competency is simply paying the competition to do the job or function and will lead to failure. The business will fail because it has transferred its reason for existence to a competitor.

Soldiers perform core functions. The Light Infantry Division cannot outsource core competencies of its information system. There is a limit in replacing soldiers with contractors.

Contractors perform only non-core functions. A contractor can support a soldier but never replace core competencies. An outsourcer simply vends complementary service. A Light Infantry Division must never transfer the fundamental essence of its information system to a contractor.

Core Competency Identification

The monograph will now define the two-stage identification model for determining core and non-core functions. Although at times core and non-core competencies may be easily determined, research indicates that a two-stage model is best for identifying core and non-core functions.¹⁹

The model provides an analytical method of determining which functions are core. Without an analytical model, the determination of core functions is a subjective decision. A subjective decision might not always be the best method of determining which functions and soldiers a contractor should replace. Instead of guessing at what is core and non-core, the monograph will use an identification model as a decision making tool.

Stage One: The Four Tenets of Outsourcing

There are four distinct reasons, or tenets, that drive an outsourcing decision.²⁰ They are cost reduction, value-added, fledgling and mature technologies. The tenets answer the question: "why outsource?"

Cost reduction was the primary decision for outsourcing strategies in the business community. An outsourcing vendor is able to "sell and/or demonstrate that they can perform an information system service cheaper than current in-house" systems.²¹ A contractor may be able to perform a function cheaper than the Light Infantry Division's current capability can provide.

Value-added benefits begin to outweigh cost reduction considerations in the future. An organization may perceive

that it can no longer provide technology or expertise from within its current workforce. Outsourcing provides value to an organization by contracting technology and expertise through a vendor. Technology and expertise is now a part of the organization. The Light Infantry Division may contract newer technologies, and the experts to operate it, more cheaply than providing from within its own organization.

Fledgling technologies are superb candidates for outsourcing.²² The US Army uses outsourcing in the study of future capability to "explore new areas and conduct trades on enabling technologies"²³. The Light Infantry Division could use outsourcing when developing and/or integrating the newest forms of technology.

Mature information system components are superb outsourcing candidates.²⁴ Long-term civilians may perform some mature or routine functions cheaper than a soldier can.²⁵

The four tenets define the reasons to outsource. It is from within this context that the seven advantages and disadvantages provide the second-stage of the model.

Stage Two: Seven Outsourcing Advantages

The Light Infantry Division can realize seven outsourcing advantages commensurate with the business community.²⁶ The advantages answer the question: "what is gained by outsourcing?"

The first advantage is mission. Outsourcing extraneous activities facilitates concentration on the mission. Outsourcing could help the Light Infantry Division's soldiers concentrate on the mission requirements and leave the routine requirements for a contractor. The Light Infantry Division can receive vended service on the peripheral and focus soldiers on the essential.

The second advantage is competitiveness. An information system that directs its energy at supporting the high-level leaders, leaving the routine and mundane for a vendor, could achieve the advantage of competitiveness. Unscheduled, future-oriented, and infrequent information are characteristics of information requirements needed by leaders and staffs within the Light Infantry Division during missions in both war and Operations Other Than War (OOTW).²⁷ The scheduled and predictable information system requirements, typical of the Division when not deployed, are suitable for outsourcing.

The third advantage is competence. Outsourcing capitalizes on paying a vendor for expertise, specialization, and abilities. The advantage of competence is simply hiring a civilian communications expert.

The fourth advantage is personnel. The Light Infantry Division can use outsourcing to eliminate the ownership cost of employing long-term soldiers. The Light Infantry Division can use outsourcing to hire civilian specialists for a specific time period.

An economy of scale is a fifth advantage of outsourcing. Vendors who perform similar functions for other business organizations can keep their costs down. The Light Infantry Division could realize this economic advantage if the correct vendor is selected.

The sixth advantage is cost control. A carefully constructed contract locks-in service for a specific fee. The contract can lead to more predictable costs and budget efficiency.

The seventh and final advantage is technologies. The contractor has the burden of keeping the latest and newest technologies available within their inventories. Technology changes every twenty-four months.²⁸ The Light Infantry Division could select vendors based on their ability to keep ahead of the ever-changing technology field.

Stage Two Continued: Seven Outsourcing Disadvantages

There are seven disadvantages of outsourcing that induce risk in the Light Infantry Division.²⁹ The disadvantages answer the question: "what is lost by outsourcing?"

The first disadvantage is obsolescence. The outsourcer may induce risk by providing outdated hardware and software. The Light Infantry Division could mistakenly pay a vendor for information services with little control over the life cycle of the technologies.

The second disadvantage is flexibility. The Light Infantry Division may have to bend operating procedures to meet the needs of the contractor. Civilians on a battlefield are not subject to the same codes of conduct or law as a soldier.

The third disadvantage is loss of control. A loss of control is a risk because the outsourcing vendor's performance may anchor the Light Infantry Division to a lower standard. A contractor meets quality and timeliness standards based on contractual obligation. The vendor's performance may indirectly control the performance of the Division.

The fourth disadvantage is risk of animosity. Friction between soldiers and information system professionals may preclude harmonious mission accomplishment. Envy, jealousy and disdain are emotions that induce risk in the Light Infantry Division.

The fifth disadvantage is contracts. The need to negotiate contracts and legal costs induce risk to the Division. Change and contracts are not always mutually supportive institutions. Contracts govern outsourcing vendors. Contracts need careful crafting. The contract must have measures to change performance standards commensurate with the dynamic nature of change during Light Infantry Division mission execution.

Security considerations are a sixth disadvantage of outsourcing. The Light Infantry Division's information system has many classified components. Security measures may negate meshing routine components with other critically sensitive components.

The seventh and final disadvantage of outsourcing lies with the interests of the vendor. The outsourcer is not necessarily a partner. They may be working for their own best interest. The vendor's profit motive could be separate and non-complementary to a Light Infantry Division.

Research indicates that three of the risks of outsourcing are common pitfalls that induce failed outsourcing strategies. In seven of fourteen Fortune 500 company case studies, failures were due to these outsourcing disadvantages.³⁰

The three most significant disadvantages are risk of interest, obsolescence, and contracts. These three disadvantages receive an additional measure of consideration in the core identification model. The identification model will weight the three most significant disadvantages of outsourcing to ensure core functions are correctly determined.

Summary: The Core Competency Identification Model

The central theme of outsourcing is to ensure only non-core competencies are contracted through a vendor. In some cases, the identification of core functions that are performed by soldiers and the non-core functions that can be performed by a contractor are easily made by subjective decision-making.

However, identification of core and non-core functions may be marginal. The monograph's two-stage model provides

an analytical methodology for core competency identification.

The first stage uses the four tenets of outsourcing to provide delineation of the reason to outsource. The four tenets are cost savings, value-added, fledgling and mature technologies.

The second stage identifies what is gained and what is lost through outsourcing. The seven advantages of outsourcing are mission, competitiveness, competence, personnel, economy of scale, cost control, and technologies. The seven disadvantages of outsourcing are the risk of obsolescence, flexibility, loss of control, animosity, contracts, security, and interest.

The monograph's two-stage model provides the objective arguments needed to identify core functions. A subjective decision to replace signal soldiers and their communications equipment with a contractor is not feasible because of the complexity of the Light Infantry Division's information system.

Chapter Four

The Light Infantry Division

"The success of US Army operations depends on the success of its divisions."³¹ The Division's information system is a decisive point in obtaining this success. The purpose of this chapter is to identify the components of the Light Infantry Division's information system. The monograph's identification model will identify these components as core or non-core competencies at the tactical and operational level.

The chapter begins with an examination of the Light Infantry Division's doctrine. Doctrine identifies the pivotal role of the Division and its information system. The chapter introduces the notion that the relationship between the Light Infantry Division's information system and the Division's operations is inextricably fused. Because of this complex relationship, the identification model will be selected as the appropriate tool for determining core competencies.

Definition of the Light Infantry Division

The Light Infantry Division is a large organization which "trains and fights as a tactical team."³² There are over 11,000 soldiers in the Division.³³ Twenty percent of the active duty divisions, two of ten, are manned according to a Light Infantry Division structure. The US Army's Light Infantry Divisions are the 10th Mountain Division (Light Infantry) at Fort Drum, New York and the 25th Infantry Division (Light Infantry) at Schofield Barracks, Hawaii.

Operations in Somalia and Haiti displayed the significant role a Light Infantry Division executes in defending US national interests. The 10th Mountain Division (Light Infantry) was alerted in 1993 to serve as the senior Army Forces (ARFOR) headquarters within Joint Task Force Warfighter for Somalia.³⁴ From September 1994 to January 1995, the Division deployed to Haiti as the Joint Task Force Headquarters during Operation Uphold Democracy.³⁵

The Light Infantry Division's versatility and flexibility reflects the nature of modern conflict. The Light Infantry Division conducts operations in environments ranging from war to peacetime.³⁶ The Division conducts missions in the context of Joint Task Forces. It can conduct combined operations within an alliance of nations.³⁷

It conducts interagency operations with other members of the US Government³⁸.

Analysis of the two recent deployments referred to above reveals several characteristics of the Light Infantry Division's information system. The system must serve more than just the needs of the Light Infantry Division. The information system supports force components ranging from sister services to US Government civilians. The system must provide information throughout the spectrum of conflict from peacekeeping to combat.

The two recent deployments also reveal that the Light Infantry Division's information system must meet requirements at both the tactical and operational level of war.³⁹ The system provides support at the tactical level by providing information requirements for "battles and engagements."⁴⁰ The system also provides support at the operational level by providing information requirements for joint campaigns.⁴¹

The Command and Control System and Information Superiority

The military definition of an information system is Command and Control System.⁴² The Command and Control System is pivotal as the "fundamental enabler" through which the Light Infantry Division gains information superiority.⁴³

Information superiority is a "must have" for the Light Infantry Division to win.⁴⁴ It is the "capability to collect, process, and disseminate an uninterrupted flow of information."⁴⁵ It is knowledge coupled with speed.⁴⁶ Information superiority is having near-perfect clarity of knowledge.

Information superiority drives all future US Army force doctrine. It is essentially a decisive point towards achieving operational concepts for the Light Infantry Division.⁴⁷

The linkage between information superiority and the Light Infantry Division's Command and Control System is inseparable. The fusion between the Command and Control System and mission accomplishment is precisely the reason that the monograph's core identification model is a suitable analytical tool. The model provides a better method of analytical decision making. An arbitrary or subjective assessment of where a contractor can replace soldiers is simply not feasible in a Light Infantry Division.

Outsourcing the Command and Control System

The US Army recognizes that outsourcing provides the leverage for optimizing the Command and Control System. To gain information superiority, the US Army desires to focus on "a growing number of partners in the science and technology communities."⁴⁸

The US Army wants to "synchronize commerce and contractors seamlessly" in the Light Infantry Division.⁴⁹ Extending the outsourcing trend to the Light Infantry Division is a logical decision.

Components of the Command and Control System

"Innovative partnerships with industry" may optimize the components of the Division's Command and Control System.⁵⁰ The following sections identify the components of the Light Infantry Division's Command and Control System.

The Soldiers

Soldiers constitute the people component of the Light Infantry Division's Command and Control System. There are 457 soldiers in the Division's Signal Battalion. They provide installation, operation, and maintenance of the greater part of the Command and Control System.⁵¹ The quantity of Signal soldiers in the Light Infantry Division has recently increased. For instance, an infantry brigade more than doubles its authorization from seven to sixteen Signal soldiers. The Division's command posts also have more Signal soldiers assigned within their organization.⁵²

The Light Infantry Division has several computer experts at selected command posts. These command posts have a high demand for digital/computer communications and therefore require specialists. A warrant officer specially trained in digital communications is assigned at the Military Intelligence Battalion.⁵³ There are two commissioned officers and one enlisted soldier serving as the digital communication staff section in the Division Support Command.⁵⁴

Outsourcing would replace many of these soldiers, if identified as non-core, with civilian contractors. The non-core equipment that the soldiers use would also be outsourcing candidates.

The Technologies

The communication equipment soldiers use is the technological component of the Light Infantry Division's Command and Control System. The Signal Corps classifies

the equipment into three functional areas.⁵⁵ The three categories are the Combat Net Radio system, the Area Common User System, and the Army Distributed Data System.

Combat Net Radio

The Light Infantry Division's Combat Net Radio (CNR) system "primarily supports voice transmissions," although it can pass data transmissions as a supplement to the digital network.⁵⁶ In the Light Infantry Division, the CNR system provides the primary means of communication for a commander at the brigade level and below. It is the secondary means of communication for the commander and staff at division level. The CNR architecture provides long-range and short-range capable equipment.

The Light Infantry Division has sixteen amplitude modulation (AM) radios such as the AN/GRC-213 and the AN/GRC-104. AM radios provide long range, high-frequency (HF) communication over distances greater than forty kilometers.

The Light Infantry Division's frequency modulation (FM) communications are based on the Single-Channel Ground and Airborne Radio System (SINCGARS) family of radios. The Light Infantry Division has over five hundred vehicular mounted FM radios to provide short-range communication up to twenty-eight kilometers. The Light Division has five hundred ninety-six FM radios at the infantry company level and below.

The CNR system has only a few Tactical Single-Channel Satellite (TACSAT) radios for extended-distance communication. The Light Infantry Division has a doctrinal authorization of three AN/PSC-3 TACSAT radios.

Area Common-User System

The Area Common-User System (ACUS) provides the primary means of communication between the brigade and division level. It is also the primary means of communication from the Division to its higher headquarters. The Division's MSE architecture is the backbone of the system. It provides telephone service at up to twenty-two locations.

The Signal Battalion provides the vast majority of the Light Infantry Division's area common-user voice network. The battalion has over one hundred million dollars of MSE equipment within its inventory to perform this task.⁵⁷ The Signal Battalion installs over seventy-five major MSE assemblages. The MSE architecture provides doctrinal area

coverage over a geographic area sixty kilometers wide by sixty kilometers long.

Users are responsible for installing, operating, and maintaining their own subscriber terminal equipment. MSE system users install equipment such as the KY-68 secure and the TA-1035 non-secure telephones for voice communication. The AN/UXC-7 lightweight digital facsimile and the AN/UGC-144 provide the ability to transmit and receive written messages. Mobile access to the MSE backbone is available using a US Army equivalent to a cellular phone, the AN/VRC-97.

Army Distributed Data System

Digital communication distribution is achieved in the Light Infantry Division on the MSE architecture. Dedicated packet-switched circuits provide a sixty-four kilobit digital wide area network (WAN) backbone. Users install their automation equipment using standard transmission control protocol and Internet protocol (X.25 TCP/IP) to ensure compatibility between systems and networks.

The Light Infantry Division purchases the majority of the computers for use on the WAN. Light Infantry Divisions use the Panasonic CF-25 laptop computer as the primary means of electronic communication such as file transfer or email.⁵⁸

The Army Distributed Data System (ADDS) does not solely rely on the MSE WAN for data communications. Doctrine assigns some computer systems, such as the field artillery's Tactical Fire Direction System (TACFIRE), to distribute information by using a FM radio.

Summary

The Light Infantry Division's Command and Control System has three technological components. The technological components are the Combat Net Radio system, the Area Common-User System, and the Army Distributed Data System. The monograph will now analyze these three components within the identification model to ascertain core and non-core competencies.

Chapter Five

Core Competency Identification

The purpose of this chapter is to identify core competencies of the Light Infantry Division's Command and Control System at the tactical and operational levels. Core competency identification begins with analysis of the Division's Combat Net Radio system.

Combat Net Radio (CNR) Analysis

The Light Infantry Division's current Combat Net Radio system is neither fledgling nor mature. The SINCGARS radio technology remains state-of-the-art and is not being replaced by the US Army.⁵⁹ Outsourcing the Division's CNR system will not leverage fledgling or mature technology tenets.

Outsourcing the CNR system will realize advantages under the tenets of cost savings and value-added. A decision to outsource is essentially leveraging an opportunity for the Division to save money (cost savings), and gain beneficial service from a vendor (value-added).

Stage one of the core competency identification model has identified two of the four tenets of outsourcing as applicable to the CNR system. Stage two quantifies the advantages and disadvantages from within this context.

Lack of Advantages

Outsourcing the CNR system does not realize any advantage. Of the seven advantages, none clearly realizes any benefit in the context of cost savings and value-added. The lack of advantages is a function of the common use of the CNR system and the current methods of delivering radios to the Division's inventory.

The Division does not realize the advantage of personnel. The Division has no ownership cost because leaders and soldiers throughout the Division use radios. There is nobody for a civilian contractor to replace.

The Division does not realize the advantages of competitiveness and competence for the same reason. Leaders and soldiers throughout the Division use the CNR system as the primary means of voice communication. A contractor would provide no measurable change for senior leaders to communicate by other means because they must inherently use a radio to lead their units. There is no additional expertise or measurable specialized skill that a

contractor could provide when the task of using a radio is so common throughout the Division.

The Division does not realize the advantage of mission for similar reasons. Outsourcing would not provide the Command and Control System any measurable ability to focus on other information requirements that are more directed towards the mission. The Light Infantry Division depends upon the CNR system as the primary means of voice communication. Outsourcing CNR would not help the Division focus its effort on another means of communication that is somehow more closely related to mission accomplishment.

The Division's current method of receiving radio inventory eliminates any realized advantage in economy of scale, cost control, or technology. Harris Corporation already builds and delivers the SINCGARS radio to the US Army. An outsourcing vendor would simply be providing service in a niche between the radio manufacturer and the user in the Division. A logical presumption is that this middle position can actually increase costs for the Division because the outsourcer cannot provide equipment cheaper than the factory.

CNR Analysis Summary

The Light Infantry Division's CNR system is a core competency. There are no realized advantages to outsourcing from within the context of cost savings or value-added. An analysis of the disadvantages and pitfalls of outsourcing is therefore moot.

Extending the outsourcing trend to the Light Infantry Division's primary method of voice communication is not feasible. There are no advantages because contractors cannot replace soldiers and equipment due to the pervasive use of the radio throughout the Division by all leaders and soldiers.

The purpose of the CNR system prohibits outsourcing. The Light Infantry Division's primary mode of voice communication at the tactical and operational level is radio. The type of radio and the technology used does not matter. The concept of voice communication throughout the Division identifies the CNR system as core.

Army Distributed Data System Analysis

Outsourcing the Light Infantry Division's data distribution architecture leverages all four tenets of outsourcing.

The tenets of fledgling and mature technologies realize advantages. The system consists of a WAN to which users connect both the older technology listed on authorization documents (the artillery's TACFIRE system),

and newly purchased computers from local sources (Panasonic CF-25 for email service). The existence of mature technology on authorization documents and the purchase of fledgling technology at a local source identify the opportunity for outsourcing.

Cost savings and value-added tenets also realize advantages. The ability of digital technology to double every two years identifies an opportunity for a vendor to deliver equipment at low cost and provide expertise to the Light Infantry Division.

The first stage of the core identification model reveals that all four tenets of outsourcing are applicable to the distributed data system. Assessment of advantages and disadvantages derive from within this context.

ADDS Advantages

The Division can realize all seven outsourcing advantages. This fact is due to the specialized nature of the equipment delivering information to specific locations. Outsourcing the ADDS realizes the advantage of mission the most clearly. Each piece of user equipment provides specific and narrow information to select locations. A vendor could provide an advantage to the Light Infantry Division by providing the least important functions and allow the Division to focus their effort on the system they deem most critical to mission accomplishment.

The same logic holds true for the outsourcing advantage of competitiveness. The Division can concentrate their information requirements for critical systems directly supporting the senior leadership. The Division can in essence delegate minor ADDS functions to a contractor.

Outsourcing the ADDS realizes the advantages of cost control, economy of scale, and technologies for the Division. The Light Infantry Division already purchases its newest automation equipment from local sources. A vendor could conceivably provide a package of equipment on a recurring basis at a lower price.

Outsourcing the ADDS realizes the advantages of competence and personnel. The Light Infantry Division has several warrant officers providing expertise at select locations such as at the Division Support Command. Outsourcing would replace some warrant officers with civilian experts at a conceivably lower cost.

ADDS Disadvantages

Although outsourcing the ADDS realizes all seven advantages, the core identification model provides caution in that three disadvantages of outsourcing are common pitfalls. Before declaring the ADDS as non-core, this section of the monograph examines the ADDS within the context of the three most significant disadvantages of outsourcing to ensure fidelity of analysis.

Outsourcing the ADDS introduces the risk of interest. The outsourcing vendor's profit motive may preclude widespread elimination of ADDS components and subsequent replacement by civilians. The Light Infantry Division will need to adjudicate this risk by selective determination.

Outsourcing the ADDS introduces the risk of contracts. The outsourcing vendor is controlled through contract stipulations. The Light Infantry Division will need flexibility in the contract to ensure that the vendor can change performance standards as the Division warrants.

Outsourcing the ADDS will not introduce the pitfall of obsolescence. The Division is already purchasing new computers and automation from local vendors. Outsourcing the ADDS would simply provide an alternative method of injecting new technology into the Command and Control System.

There are two outsourcing pitfalls applicable in outsourcing the ADDS. Contract and interest pitfalls appear to induce risk. The ADDS is non-core if the Light Infantry Division can mitigate this risk. The ADDS is core if the Light Infantry Division cannot successfully mitigate the risks of contract and interest in the ADDS.

ADDS Analysis Summary

The Light Infantry Division's distributed data system is a non-core competency. Outsourcing the ADDS realizes all seven advantages from within the context of cost savings, value-added, fledgling, and mature technologies.

An analysis of disadvantages identifies two common pitfalls as applicable. Pitfalls induce risk. The Light Infantry Division mitigates risk, as it deems necessary. Extending the outsourcing trend to the Light Infantry Division's primary method of data distribution is feasible. There are outsourcing advantages realized in part because the Division already obtains new technology from vendors. Mature technologies already on the Division's inventory identify potential outsourcing opportunity advantages. The select geographic locations of the technology currently in use, coupled with the small number of soldiers managing

this specialized equipment, further identifies advantages that identify the ADDS as non-core.

Previously, analysis of the Division's CNR system stated that the type of radio and the technology used did not matter. It was the CNR system concept that identifies voice communication as core. The ADDS case is exactly opposite that of the CNR system. The ADDS is non-core precisely because of technology and specialization.

Area Common User System Analysis

The Light Infantry Division's current Area Common User System is both fledgling and mature. The MSE network is over ten years old. The US Army recognizes the inadequacy of the MSE network and will replace it with a new generation of technology, the Warfighter Information Network-Terrestrial (WIN-T), beginning in 2001.⁶⁰ WIN-T will be fielded in phases over a six-year period. The ACUS will therefore be composed of both fledgling and mature technologies until MSE is completely replaced by WIN-T.

Cost savings and value-added tenets apply to ACUS outsourcing. New equipment architecture such as WIN-T demonstrates an ability to leverage expertise and technology at low cost commensurate with what the US Army currently achieves with the MSE network.

Stage one of the core competency identification model has identified all four tenets of outsourcing as applicable to the ACUS. Stage two exposes a complex relationship between advantages and disadvantages from within these tenets.

Advantages and Disadvantages

Outsourcing the ACUS component of the Command and Control System is a more complex issue than either the CNR system or the distributed data system. This fact derives from the communication requirement niche that ACUS holds. ACUS merges the concept of the CNR system and the requirements of the ADDS.

First, the ACUS extends voice communication over distances greater than a radio can achieve. CNR is the primary means of voice communication in the Division. ACUS provides telephone and message communication throughout the Light Infantry Division where the CNR system range cannot reach. It is therefore evident that ACUS supplements CNR. ACUS simply fills a technology void.

Secondly, the ACUS provides the equipment architecture for the transmission of data over the distributed data system. The ACUS has prescribed channels that physically constitute the Division's WAN. The ACUS is therefore

anchored to technology in order to provide the means of moving data for the ADDS.

The Area Common-User System will therefore gain the commensurate advantages and disadvantages of outsourcing CNR and ADDS. Because outsourcing the CNR system will not realize any of the seven advantages, the ACUS will not realize advantages. However, ACUS could achieve all seven of the advantages to outsourcing similar to the ADDS as long as two pitfall risks are mitigated.

An exhaustive listing of each advantage and disadvantage in outsourcing the ACUS is not attainable. For each potential advantage, a corresponding disadvantage will emerge. The monograph's core identification model actually fails to provide a means of obtaining an analytical decision on core or non-core competency.

ACUS Analysis Summary

The Area Common-User System in the Light Infantry Division is neither core nor non-core. The system is perched between a mature MSE architecture and the introduction of the WIN-T fledgling technology. The ACUS purpose is to fill the technological void of the CNR system along with providing the technology for establishing the Division's WAN. The ACUS exists to supplement ADDS and the CNR systems.

Examination of outsourcing the ACUS exposes the fact that the Division's Command and Control System is not a triad of functions. The Division's Command and Control System is actually only composed of digital and voice components, the ADDS and CNR systems. The ACUS simply fills a technology void. This startling revelation will assist in determining recommendations and conclusions in the monograph's final chapter.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to provide conclusions and recommendations for outsourcing the Command and Control System of the Light Infantry Division. The chapter provides conclusions of both current and future outsourcing strategies.

Current Core Competencies

The Light Infantry Division's current Command and Control System has core and non-core competencies. The Combat Net Radio system is a core competency. The Army Distributed Data System is non-core. Light Infantry Divisions should use this delineation as a framework for outsourcing decisions.

The monograph provides a start point for developing outsourcing strategies for the Light Infantry Division's current Command and Control System. The Light Infantry Division should not outsource the CNR system. The Light Infantry Division could, however, consider outsourcing the ADDS.

Outsourcing the Future Command and Control System

The monograph's core identification model revealed that the Light Division's Command and Control System is actually composed of two functions. CNR provides voice communication by radio. The ADDS provides data distribution by a WAN. The Army Common-User System simply fills a technological void in CNR and ADDS. CNR is conceptually-driven, where many users require voice communication throughout the Division without regard to the type of technology in use. ADDS is technology-driven, where specific users require access to the WAN. Perhaps technology will meld these two requirements together.

A hypothetical example will better develop the point. A current technology as simple as a cellular phone provides voice and data communication ability. Technological advances could proceed to an extent where a similar device is available for users in the Light Infantry Division.

This device would provide the primary means of both voice and data communication. It would transcend the purpose of the Combat Net Radio and Army Distributed Data Systems. The device would eliminate the current need of the Area Common User System to provide range extension and WAN architecture.

The future Light Infantry Division's Command and Control System would then consist of only one functionality sphere instead of its current triad of CNR, ADDS, and ACUS. Eventually, technology will eliminate the triad and fuse the purpose of each component into one overarching requirement that manifests into one communication device. Outsourcing would then provide an increased role if the device were non-core.

The monograph predicts a lessened role for the future Light Infantry Division's Signal Battalion due to outsourcing a single non-core device. Outsourcing would replace the greater majority of the Signal Battalion with a commercial source for providing a technologically advanced device. The Signal Battalion will be relegated to managing the contract that governs the contractor's performance standards.

The reason the Division's Signal Battalion will have a diminished role is because of the Battalion's purpose. The primary purpose of the Division's Signal Battalion is to provide the Army Common-User System. The Signal Battalion provides the ACUS on its MSE and WIN-T architecture. An outsourcing vendor providing a single, technologically advanced device will nearly eliminate the purpose of the Signal Battalion at a cost saving of over five hundred soldiers and an equipment inventory of over one hundred million dollars.

The monograph predicts that the Light Infantry Division will reduce the number of Signal personnel in other units within the Division due to outsourcing. Expert warrant officers with specialized computer skills at locations such as the Division Support Command and the Military Intelligence Battalion will no longer be required. The future communication device, along with the expertise provided by the outsourcing vendor, will eliminate the requirement for these officers.

Interim Recommendation

The Light Infantry Division can use outsourcing to solve problems with its current Command and Control System. Although outsourcing plays an ever-increasing role in the Division's future, it can solve current operational shortfalls.

Force projection stages are the stages a division takes to respond to crisis.⁶¹ Each stage presents unique opportunities for outsourcing strategies. The stages that this monograph examines are the deployment, entry and redeployment stages.

The deployment stage is the strategic and operational movement of the Light Infantry Division to the area of operation. It is the combination of rail, sea, and air transportation that moves the Light Infantry Division to the theater of operations.

The monograph predicts that outsourcing the Command and Control System is feasible during this stage. First, the Light Infantry Division's system is likely to be unavailable for use because it moves with the rest of the Division's equipment. A vendor could provide a suite of communication gear for use by the Light Infantry Division as it loads its equipment on rail cars and airframes.

The entry operations stage "encompasses the occupation of the initial lodgements" at the crisis location.⁶² The Light Infantry Division does no more than "self-sustainment" as units and resources arrive.⁶³

The monograph predicts that outsourcing is feasible in this stage. The Light Infantry Division could leverage benefits similar to the deployment stage. The greatest advantage is once again to allow the Division to focus on core competencies. A vendor could provide an information system that continues to support the Division prior to conducting decisive operations.

The 10th Mountain Division (Light Infantry) uses outsourcing during the entry and redeployment stages. The Division leases computers and other technologies from third party vendors at Fort Polk, Louisiana during training exercises at the US Army's Joint Readiness Training Center (JRTC).⁶⁴ The next logical step is to outsource not only during training exercises but also in crisis response missions.

The 10th Mountain Division (Light Infantry) will conduct joint experiments in September 2000 to demonstrate that modernization of light forces provides enhanced capability.⁶⁵ The experiment hinges on leveraging advanced technology to obtain information superiority.

Outsourcing non-core competencies of the Division's Command and Control System will help the Division obtain information superiority. Outsourcing will have a role in Light Infantry Division experimental testing, crisis response, and have an even greater role in the future Command and Control System.

BIBLIOGRAPHY

BOOKS

- Ambrose, Stephen E. The Victors, Eisenhower and His Boys: The Men of World War II. New York: Simon & Shuster, 1998.
- Guderian, Heinz. Achtung-Panzer! (Christopher Duffy, Trans.). London: Arms and Armour Press, 1995, (Original work published 1937).
- Keegan, John. The Mask of Command. London: Penguin Books, 1997.
- Kerzner, Harold. Project Management, A Systems Approach to Planning, Scheduling, and Controlling (Sixth Edition). New York: John Wiley & Sons, Inc., 1998.
- Licker, Paul S. Management Information Systems, A Strategic Leadership Approach. Orlando: The Dryden Press, Harcourt Brace & Company, 1997.
- Long, Larry and Nancy Long. Computers, Fifth Edition. Upper Saddle River, New Jersey: Prentice Hall, 1998.
- MacGregor, Douglas A. Breaking the Phalanx, A New Design for Landpower in the 21st Century. Westport, Connecticut: Praeger, 1997.
- National Defense University, Institute for National Strategic Study. Lessons from Bosnia: The IFOR Experience. Department of Defense Command and Control Research Program: Institute for National Strategic Studies Press, 1997.
- Russell, Deborah and G.T. Gangemi, Sr. Computer Security Basics. U.S.: O'Reilly & Associates, Inc., 1991.
- U.S., Department of Commerce. Special Publication 800-12, An Introduction to Computer Security: The NIST Handbook. National Institute of Standards and Technology, Technology Administration. 1998.

- Whitten, Jeffrey L. and Lonnie D. Bentley.). Systems Analysis and Design Methods (Fourth Edition). Boston: Irwin McGraw-Hill, 1998.
- Weigley, Russel Frank. Eisenhower's Lieutenants: The Campaign of France and Germany, 1944-1945. Bloomington, Indiana: Indiana University Press, 1990.
- Woodward, Bob. The Commanders. New York: Pocket Star Books. 1991.

PERIODICALS

- Franklin, George. "In the Air Force." The Military Engineer, vol. 90, no. 592. (1998 June-July): 7-8.
- LaVoie, Joseph and Satish Sharme. "Outsourcing and Privatization In the Army." The Military Engineer, vol. 90, no. 592. (1998 June-July): 4-6.
- Newman, Richard. "Hey There Fella, Have I Got A Foxhole For You." U.S. News & World Report (1999 August 02): 33.
- Streicher, Burton L. and Richard Hergenroeder. "In the Navy." The Military Engineer, vol. 90, no. 592. (1998 June-July): 6-7.
- Thompson, Loren. "Defense Outsourcing: The Coming Revolution." Sea Power, vol. 40 no.2. (1997 February): 31-34.

RESEARCH PAPERS

- McTernan, Hugh J. Information Superiority: Outsourcing an Air Force Core Competency? Air Force Institute of Technology Master's Thesis. Wright-Patterson Air Force Base, OH: Government Printing Office, 1997. National Technical Information Services reference number ADA3351699XSP.
- Ross, Blair and Terrance Spoon. Potential Combat Risks from Outsourcing of Selected Sustainment Functions. U.S. Army War College Research Monograph. Carlisle Barracks, PA: Government Printing Office, 1998. National Technical Information Services reference number ADA353783XSP.

MILITARY REFERENCE MANUALS

U.S. Department of the Army. Field Manual 11-30. Command and Control Architecture. Washington, D.C.: 27 February 1991.

_____. Field Manual 11-41. Signal Support: Echelons Corps and Below (ECB). Washington, D.C.: 18 December 1991.

_____. Field Manual 24-7. Tactical Local Area network (LAN) Management. Washington, D.C.: 8 October 1999.

_____. Field Manual 25-100. Training The Force. Washington, D.C.: November 1998.

_____. Field Manual 71-100. Division Operations. Washington, D.C.: June 1990

_____. Field Manual 71-123. Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company/Team. Washington, D.C.: 30 September 1992.

_____. Field Manual 100-5. Operations. Washington, D.C.: June 1993.

_____. Field Manual 100-7. Decisive Force: The Army in Theater Operations. Washington, D.C.: May 1995.

_____. Field Manual 101-5-1. Operational Terms and Graphics. Washington, D.C.: 30 September 1997.

U.S. Joint Chiefs of Staff. Joint Publication 1. Joint Warfare of the U.S. Armed Forces. Washington, D.C.: 11 November 1991

_____. Joint Publication 1-02. Department of Defense Dictionary of Military and Associated Terms. Washington, D.C.: 23 March 1994.

ELECTRONIC SOURCES

Brower, Michael. "Outsourcing at DOD: All It's Cracking People Up to Be?" Center for Army Lessons Learned, LXXVII, (6). 1997 November-December, Document RWP-02-5404.

Harris Corporation. "Government Systems". Harris Corporation Home Page. 21 November 1999. Available: www.harris.com

Reimer, Dennis. "Challenge and Change: A Legacy for the Future." Center for Army Lessons Learned, LXXVII (4). 1997 July-August, Document RWP-02-5314.

Stahl, David T. Operation Uphold Democracy, Slide Presentation and After Action Report. 10th Mountain Division (Light Infantry), 1995. [CD-ROM]. Available: Combined Arms Research Library (CARL), Ft. Leavenworth, Kansas: Reference Desk.

U.S., Army Training and Doctrine Command. "Army Vision 2010." U.S. Army Home Page. 28 July 1999. Available: [Http://www4.army.mil/2010/](http://www4.army.mil/2010/)

_____. "TRADOC Mission and Vision." U.S. Army Training and Doctrine Command Home Page. 28 July 1999. Available: [Http://www.tradoc.army.mil/tradmis.htm](http://www.tradoc.army.mil/tradmis.htm)

_____. "Army Vision 2010-Information Superiority." U.S. Army Training and Doctrine Command Home Page. 28 July 1999. Available: [Http://www4.army.mil/2010/information_superiority.htm](http://www4.army.mil/2010/information_superiority.htm)

_____. "Knowledge and Speed-The Annual report on the Army After Next Project to the Chief of Staff of the Army, July 1997." 28 July 1999. U.S. Army Training and Doctrine Command Home Page. Available: [Http://www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm](http://www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm)

_____. "Knowledge and Speed: The 1998 Annual Report on the Army After Next Project to the Chief of Staff of the Army." 2 August 1999. U.S. Army Training and Doctrine Command Home Page. Available: www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm

_____. "Strike Force Information Paper." U.S. Army

Training and Doctrine Command Home Page. 2 August 1999. Available:
<http://www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm>

U.S. Chairman of the Joint Chiefs of Staff. "Joint Vision 2010." U.S. Army Training and Doctrine Command Home Page. 28 July 1999. Available:
[Http://www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm](http://www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm)

U.S., Requirements Documentation Directorate (RDD), Army Force Management Support Agency, Fort Leavenworth, Kansas. Consolidated TOE Update: April 1999. 23 October 1999. Available: www.usafmsaradd.army.mil

United States Army Signal Center and Fort Gordon, Georgia. "The Command and General Staff Officer College Module A307 Advanced Communications slide presentation." Army Signal Corps On-Line Information System. 29 March 1999. Available: <http://www.gordon.army.mil/ace>.

_____. "Signal Regiment Strategic Plan." Army Signal Corps On-Line Information System. 7 July 1999. Available:
<http://www.gordon.army.mil/stratpln/index.htm>

_____. "Signal Regiment Definition." Army Signal Corps On-Line Information System. 7 July 1999. Available:
[Http://www.gordon.army.mil/statpln/sigregt.htm](http://www.gordon.army.mil/statpln/sigregt.htm)

_____. "Signal Regiment Purpose, Mission, and Vision." Army Signal Corps On-Line Information System. 7 July 1999. Available:
[Http://www.gordon.army.mil/statpln/regtthot.htm](http://www.gordon.army.mil/statpln/regtthot.htm).

_____. "Glossary." Army Signal Corps On-Line Information System. 7 July 1999. Available:
[Http://www.gordon.army.mil/statpln/glossary.htm](http://www.gordon.army.mil/statpln/glossary.htm).

Interviews

Bell, Anthony, Major, U.S. Army, Interview by author, Fort Leavenworth, Kansas, November 1998.

Burrell, Clinton, Major, U.S. Army, Interview by author, Fort Drum, New York, June 1998.

Moore, Brian, Major, U.S. Army, Interview by author, December 1998, Fort Drum, New York.

END NOTES

¹ United States Army Signal Center and Fort Gordon, Georgia, "Signal Regiment History", Army Signal Corps On-Line Information System (1999 July 07), Available: [Http://www.gordon.army.mil/signal/reghist.htm](http://www.gordon.army.mil/signal/reghist.htm)
Congress authorized the Signal Corps on 3 March 1863.

² John Keegan, The Mask of Command (London, England: Penguin Books, 1997), 210-212.

³ U.S., Headquarters, Department of the Army, Field Manual 101-5-1 Operational Terms and Graphics (Washington, D.C., 30 September 1997), 1-115. A Joint term. The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations.

⁴ Paul S. Licker, Management Information Systems, A Strategic Leadership Approach (Orlando, Florida: The Dryden Press, Harcourt Brace & Company, 1997), 446. Dr. Licker is a professor at The University of Calgary. He defines outsourcing as "a process of acquiring products or services from outside the organization".

⁵ Jeffrey L. Whitten and Lonnie D. Bentley, Systems Analysis and Design Methods, Fourth Edition (Boston, Massachusetts: Irwin McGraw-Hill), 15-16. The authors are professors at Purdue University. They define outsourcing as "contracting a service or function to an external third party". Ownership costs stem from the investment in the workforce to keep them current and in technology to keep the latest products available to potential customers. Outsourcers are able to sell and/or demonstrate that they can provide information technology and services cheaper.

⁶ United States Army Signal Center and Fort Gordon, Georgia, "Signal Regiment Definition", Army Signal Corps On-Line Information System (1999 July 07), Available: [Http://www.gordon.army.mil/signal/reghist.htm](http://www.gordon.army.mil/signal/reghist.htm)
General Telephone Equipment (GTE) produced and delivered MSE to the US Army in 1988.

⁷ Whitten and Bentley, Systems Analysis and Design Methods, Fourth Edition, 15. The authors note that a key future outsourcing idiosyncrasy is in value added to an organization. Contractors will more likely outsource to gain technology and expertise.

⁸ Loren Thompson, "Defense Outsourcing: The Coming Revolution," in Sea Power, 40, no.2 (February 1997): 32.

⁹ Ibid., 31.

¹⁰ Joseph LaVoie and Satish Sharme, "Outsourcing and Privatization in the Army," in The Military Engineer, 90, no.592 (June-July 1998): 4.

¹¹ Ibid., 5.

¹² CAPT Burton L. Streicher and Richard Hergenroeder, "In the Navy," in The Military Engineer, 90, no.592 (June-July 1998): 6.

¹³ George Franklin, "In the Air Force," in The Military Engineer, 90, no.592 (June-July 1998): 7.

¹⁴ Licker, Management Information Systems, A Strategic Leadership Approach, 449-450. Dr. Licker proposes a model that predicts outsourcing success or failure. His model evaluates the outsourcing strategy to provide a analytical method of core competency identification.

¹⁵ Whitten and Bentley, Systems Analysis and Design Methods, Fourth Edition, 14.

¹⁶ Licker, Management Information Systems, A Strategic Leadership Approach, 446-447.

¹⁷ Larry and Nancy Long, Computers, Fifth Edition (Upper Saddle River, New Jersey: Prentice Hall, 1998), 23. The authors specify the components of an information system as "the combination of hardware, software, people, procedures, and data".

¹⁸ Webster's New World Dictionary, Second Concise Edition, edited by David B. Guralnik, 169.

¹⁹ Grover and Teng quoted in Paul S. Licker, Management Information Systems, A Strategic Leadership Approach, 448.

²⁰ Whitten and Bentley, Systems Analysis and Design Methods, Fourth Edition, 15.

²¹ Licker, Management Information Systems, A Strategic

Leadership Approach, 449.

²² Ibid., 448.

²³ U.S., Army Training and Doctrine Command, "Knowledge and Speed: The 1998 Annual Report on the Army After Next Project to the Chief of Staff of the Army", Annex A, 5, U.S. Army Training and Doctrine Command Home Page (1999 August 2), Available: www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm
The reference is the US Army's second annual report that represents more than two years of exploration into the nature of future warfare.

²⁴ Licker, Management Information Systems, A Strategic Leadership Approach, 448.

²⁵ United States Army Signal Center and Fort Gordon, Georgia, "Directorate of Information Management", Army Signal Corps On-Line Information System, (1999 July 07), Available: [Http://www.gordon.army.mil/doim/staffdir/default.htm](http://www.gordon.army.mil/doim/staffdir/default.htm)
The US Army currently outsources a portion of Army post information systems. The Directorate of Information Management installs, operates, and maintains the post telecommunications and digital networks. It is the tenet of mature technology that transfers the mundane and scheduled operation of a fort's information system to an outsourcer.

²⁶ Licker, Management Information Systems, A Strategic Leadership Approach, 449.

²⁷ U.S., Headquarters, Department of the Army, Field Manual 100-5, Operations (Washington, D.C., June 1993), Glossary-6. Military activities during peacetime and conflict that do not necessarily involve armed clashes between two organized forces.

²⁸ Harold Kerzner. Project Management, A Systems Approach to Planning, Scheduling, and Controlling (New York, New York: John Wiley & Sons Inc., 1998), 867. Computer technology doubles every two years.

²⁹ Licker, Management Information Systems, A Strategic Leadership Approach, 449-450.

³⁰ Mary Lacity and Rudy Hirschheim quoted in Paul S. Licker, Management Information Systems, A Strategic Leadership Approach, 451.

³¹ U.S., Headquarters, Department of the Army, Field Manual 71-100, Division Operations (Washington, D.C., 28 August

1996), 1-1.

³² Ibid., 1-1.

³³ U.S., Requirements Documentation Directorate (RDD), Army Force Management Support Agency, Fort Leavenworth, Kansas, "Table of Authorization 77000A00LID", Consolidated TOE Update: April 1999 (23 October 1999), Available: www.usafmsaridd.army.mil
RDD manages the US Army's requirements documentation program. Official authorization documentation for the Light Infantry Division is provided on-line by RDD.

³⁴ U.S., Headquarters, Department of the Army, Field Manual 71-100, Division Operations, 1-3.

³⁵ Headquarters, 10th Mountain Division (Light Infantry), Operations in Haiti, edited by LTC David T. Stahl, CD-ROM, 4. Reference is a CD-ROM after-action review of Operation Uphold Democracy from August 1994 through January 1995. Available at the Combined Arms Reference Library, Fort Leavenworth, Kansas.

³⁶ U.S., Headquarters, Department of the Army, Field Manual 100-5, Operations, 2-1. The three states of environment in descending order are war, conflict, and peacetime.

³⁷ Ibid., Glossary-2. An operation conducted by forces of two or more allied nations acting together for the accomplishment of a single mission.

³⁸ U.S., Headquarters, Department of the Army, Field Manual 101-5-1, Operational Terms and Graphics, 1-84. Any action that combines the human and material resources of two or more independent organizations, be they governmental, international, or private, in prosecution of a common objective.

³⁹ U.S., Headquarters, Department of the Army, Field Manual 101-5-1, Operational Terms and Graphics, 1-115. The operational level of war is a Joint term. It is the level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations.

⁴⁰ Ibid., 1-50.

⁴¹ Ibid., 1-23. A campaign is a Joint term. It is a series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space.

⁴² U.S. Joint Chiefs of Staff, Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms (Washington, DC: Government Printing Office, 1994 March 23), Joint Electronic Library, CD-ROM, June 1998. The full definition is the facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

⁴³ United States Army Signal Center and Fort Gordon, Georgia, "Signal Regiment Purpose, Mission, and Vision", Army Signal Corps On-Line Information System (1999 July 07), Available: [Http://www.gordon.army.mil/statpln/regtthot.htm](http://www.gordon.army.mil/statpln/regtthot.htm). The Signal Regiment is "the team of soldiers and civilians dedicated to providing and managing information systems and services for war-fighters". The Regiment is the action agency for the Army's Command and Control System.

⁴⁴ U.S., Army Training and Doctrine Command, "Army Vision 2010", U.S. Army Home Page (1999 July 28), Available: [Http://www4.army.mil/2010/](http://www4.army.mil/2010/) The reference states that "the Army will need to continuously leverage technology to ensure our force has the requisite advantage to preclude conflict if possible, but to win decisively if necessary".

⁴⁵ Ibid., Information superiority enables the other four concepts of future US Army operations: dominant maneuver, precision engagement, full dimensional protection, and focused logistics.

⁴⁶ U.S., Army Training and Doctrine Command, "Knowledge and Speed-The Annual Report on the Army After Next Project to the Chief of Staff of the Army, July 1997", U.S. Army Training and Doctrine Command Home Page (1999 July 28), Available: <http://www.tradoc.army.mil/dcsdoc/fbdaan/aanframe.htm> The source is the U.S. Army's first published study on the future nature of war and the organization of U.S. Army units to meet threats in this environment.

⁴⁷ U.S., Headquarters, Department of the Army, Field Manual 101-5-1 Operational Terms and Graphics, 1-46. A US Army term. A point, if retained, that provides a commander with

a marked advantage over his opponent. Decisive points are usually geographic in nature but could include other physical elements such as enemy formations, command posts, and communication nodes.

⁴⁸ U.S., Army Training and Doctrine Command, "Knowledge and Speed: The 1998 Annual Report on the Army After Next Project to the Chief of Staff of the Army", U.S. Army Training and Doctrine Command Home Page, Annex A, 5.

The report concludes with the statement "innovative partnerships with industry offer the means to leverage emerging technologies and services at reasonable costs".

⁴⁹ Ibid., 2. The reference cites not only a need for integration of contractors into the US Army but also within the context of Joint and Combined operations with sister services and alliance partners.

⁵⁰ Ibid., 2.

⁵¹ U.S., Requirements Documentation Directorate (RDD), Army Force Management Support Agency, Fort Leavenworth, Kansas, "Table of Authorization 1105L200 Div Sig Bn (MSE) LID", Consolidated TOE Update: April 1999. The reference is the doctrinal authorization of the Light Infantry Division's Signal battalion.

⁵² U.S., Headquarters, Department of the Army, Field Manual 101-5-1, Operational Terms and Graphics, 1-34. A Joint term. It is a unit or sub-unit's headquarters where the commander and the staff perform their activities.

⁵³ U.S., Requirements Documentation Directorate (RDD), Army Force Management Support Agency, Fort Leavenworth, Kansas, "Table of Authorization 34355A200 MI", Consolidated TOE Update: April 1999. The reference is the doctrinal authorization of the Light Infantry Division's Military Intelligence battalion.

⁵⁴ U.S., Requirements Documentation Directorate (RDD), Army Force Management Support Agency, Fort Leavenworth, Kansas, "Table of Authorization 63220A100 DISCOM", Consolidated TOE Update: April 1999. The reference is the doctrinal authorization of the Light Infantry Division's logistics organization, the Division Support Command.

⁵⁵ U.S., Headquarters, Department of the Army, Field Manual

11-30, Command and Control Architecture (Washington, D.C., 27 February 1991), 2-2, Available www.adtdl.army.mil/cgi-bin/atdl.dll/fm/11-30/CH2.htm The Signal Corps groups communications into three functionality spheres. They are the Area Common User System, Army Distributed Data System, and Combat Net Radio.

⁵⁶ U.S., Headquarters, Department of the Army, Field Manual 11-41, Signal Support: Echelons Corps and Below (ECB) (Washington, D.C., 18 December 1991), 3-5.

⁵⁷ MAJ Burrell, Clinton. Interview by author. Fort Drum, New York, June 1998. MAJ Burrell, then serving as the executive officer of the 10th Signal Battalion, 10th Infantry Mountain Division (Light Infantry), was interviewed by the author. MAJ Burrell provided the author with the total value of the battalion's equipment inventory.

⁵⁸ MAJ Bell, Anthony. Interview by author. Fort Leavenworth, Kansas, November 98. MAJ Bell served as the S-3 of the 125th Signal Battalion, 25th Infantry Division (Light Infantry) prior to his attendance at the Command and General Staff Officer Course, Ft. Leavenworth, Kansas, academic year 98-99. The author was the prior S-3 of 10th Signal Battalion, 10th Infantry Division (Light Infantry) during the same time period that MAJ Bell was assigned as the 125th Signal Battalion's S-3. Both divisions locally purchase computer and automation equipment. The divisions both use the Panasonic CF-25 as the primary platform for email and file distribution.

⁵⁹ Harris Corporation, "Government Systems", Harris Corporation Home Page (1999 November 21), Available: www.harris.com The Harris Corporation began initial fielding of SINCGARS to the US Army in 1989.

⁶⁰ United States Army Signal Center and Fort Gordon, Georgia, "Advanced Communications", Army Signal Corps On-Line Information System (1999 July 07), Available: [Http://www.gordon.army.mil/ace/mod9.exe](http://www.gordon.army.mil/ace/mod9.exe) The Signal Corps provides the slide presentations for the CGSC course A307 Advanced Communications at this Internet site. Module 9 is the briefing presenting WIN-T to the Signal officers of CGSC class 98-99.

⁶¹ Ibid., 6-14.

⁶² Ibid., 6-17.

⁶³ Ibid

⁶⁴ MAJ Moore, Brian. Interview by author. Fort Drum, New York, December 1998. MAJ Moore, then serving as the S-6 of 2d Brigade, 10th Mountain Division (Light Infantry), used outsourcing during the entry operation stage by leasing automation from a local computer vendor in Leesville, Louisiana. The same items were again leased during redeployment and reconstitution stages. The author, then serving as the S-6 of 1st Brigade, 10th Mountain Division (Light Infantry), leased a identical suite of automation in January 1997.

⁶⁵ U.S., Army Training and Doctrine Command, "Army Experimentation Campaign Plan", TRADOC Home Page (1999 July 28), Available: [Http://huachuca-dcd.army.mil/C&TDD/aecp.htm](http://huachuca-dcd.army.mil/C&TDD/aecp.htm)

A portion of the US Army's approach to managing future experimentation is to "digitize" the 10th Mountain Division (Light Infantry). The Light Infantry Division will focus on leveraging technology in the context of operations in urban and restrictive terrain.